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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,496	01/26/2005	Adolf Inneman	B2018-7000US	4490
37462	7590	06/21/2006	EXAMINER	
LOWRIE, LANDO & ANASTASI RIVERFRONT OFFICE ONE MAIN STREET, ELEVENTH FLOOR CAMBRIDGE, MA 02142			HO, ALLEN C	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/522,496

Applicant(s)

INNEMAN ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 19-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 19-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>26012005</u>  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Drawings*

1. Fig. 3 is objected to because it is informal.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a detector claimed in claim 19 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the fixing means as claimed in claims 24, 25, and 28 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.
4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the positioning means as claimed in claim 29 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

5. The disclosure is objected to because of the following informalities:

Page 6, line 25, the phrase --now U. S. Patent No. 6,782,076 B2-- should be inserted after the filing date.

Appropriate correction is required.

### *Claim Objections*

6. Applicant is advised that should claim 24 be found allowable, claim 29 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

7. Claim 29 is objected to because of the following informalities:

Line 2, "the" should be deleted.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 31-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 32-34 recite a step of receiving the focused high energy radiation from the optical device onto a lithographic specimen via a lithographic mask. This language is indefinite as it is unclear as to whether the high energy radiation is focused onto the lithographic specimen or the lithographic mask.

10. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The Soller slit claimed in claim 31 comprises flat surfaces that are non-parallel, while a Soller slit in the conventional sense comprises parallel flat surfaces. The term is indefinite because the specification does not clearly redefine the term. A discussion of Soller slit is given by Cullity and Stock.

***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 19-25 and 28-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Castleberry (U. S. Patent No. 6,438,210 B1).

With regard to claim 19, Castleberry disclosed an optical device comprising: a plurality of plates (112) providing a plurality of flat surfaces positioned to provide a function selected from the group consisting of total external reflection (at glancing angle) and collimating of high energy radiation from a high energy radiation source, wherein the plurality of flat surfaces are non-parallel. Note: The recitations "a high energy radiation source" and "the plurality of plates located at a position selected from the group consisting of after the radiation source and before a detector positioned to receive the high energy radiation" have not been given patentable weight because they are not positively claimed. This claim claims an optical device, not a high energy radiation source and/or a detector. The positioning of the optical device relative a radiation source and/or a detector is interpreted by the examiner as intended placement of the optical device, which does not limit the structure of the optical device.

With regard to claims 20 and 21, Castleberry disclosed the optical device of claim 19, wherein each of the plurality of flat surfaces is substantially normal to an arcuate surface (this is

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a focused collimator). Note: the recitations of "the source" and "the detector" have not been given patentable weight. See rejection of claim 19.

With regard to claim 22, Castleberry disclosed the optical device of claim 19, wherein the high energy radiation comprises x-ray radiation (2).

With regard to claim 23, Castleberry disclosed the optical device of claim 19, wherein the plurality of plates are capable of collimating extreme ultraviolet (EUV) radiation.

With regard to claim 24, Castleberry disclosed the optical device of claim 19, further comprising fixing means (111) for fixing the position of the plurality of plates relative to each other.

With regard to claim 25, Castleberry disclosed the optical device of claim 24, wherein the fixing means is transmissive to the high energy radiation (column 5, lines 18-20).

With regard to claim 28, Castleberry disclosed the optical device of claim 24, wherein the fixing means comprises an adhesive (column 5, lines 18-20).

With regard to claim 29, Castleberry disclosed the optical device of claim 19, further comprising a positioning device (122, 124) for positioning the plurality of plates relative to each other.

With regard to claim 30, Castleberry disclosed the optical device of claim 19, wherein the optical device is a multifoil optic (column 5, lines 11-27).

With regard to claim 31, Castleberry disclosed the optical device of claim 31, wherein the optical device is a Soller slit. This claim fails to set forth additional structural limitation because it recites intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably

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distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

13. Claims 19, 22-24, 26, 29, 30, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Cash, Jr. (U. S. Patent No. 6,049,588).

With regard to claim 19, Cash, Jr. disclosed an optical device comprising: a plurality of plates (21, 23, 30, 31, 32, 41) providing a plurality of flat surfaces positioned to provide a function selected from the group consisting of total external reflection (at glancing angle) and collimating of high energy radiation from a high energy radiation source, wherein the plurality of flat surfaces are non-parallel. Note: The recitations "a high energy radiation source" and "the plurality of plates located at a position selected from the group consisting of after the radiation source and before a detector positioned to receive the high energy radiation" have not been given patentable weight because they are not positively claimed. This claim claims an optical device, not a high energy radiation source and/or a detector. The positioning of the optical device relative a radiation source and/or a detector is interpreted by the examiner as intended placement of the optical device, which does not limit the structure of the optical device.

With regard to claim 22, Cash, Jr. disclosed the optical device of claim 19, wherein the high energy radiation comprises x-ray radiation.

With regard to claim 23, Cash, Jr. disclosed the optical device of claim 19, wherein the plurality of plates are capable of collimating extreme ultraviolet (EUV) radiation.

With regard to claim 24, Cash, Jr. disclosed the optical device of claim 19, further comprising fixing means for fixing the position of the plurality of plates relative to each other (this is inherent).



With regard to claim 26, Cash, Jr. disclosed the optical device of claim 19, wherein the plurality of plates includes a coating material (column 5, line 33 - column 6, line 12).

With regard to claim 29, Cash, Jr. disclosed the optical device of claim 19, further comprising a positioning device for positioning the plurality of plates relative to each other (this is inherent).

With regard to claim 30, Castleberry disclosed the optical device of claim 19, wherein the optical device is a multifoil optic (column 5, lines 18-32).

With regard to claim 31, Cash, Jr. disclosed the optical device of claim 31, wherein the optical device is a Soller slit. This claim fails to set forth additional structural limitation because it recites intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

14. Claims 32-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Richardson *et al.* (U. S. Patent No. 5,459,771).

With regard to claim 32, Richardson *et al.* disclosed a method for performing high energy radiation lithography, comprising the steps of: receiving high energy radiation from a high energy radiation source (300); focusing the high energy radiation from the high energy radiation source using an optical device (450); and receiving the focused high energy radiation from the optical device onto a lithographic specimen (700) via a lithographic mask (500).

With regard to claim 33, Richardson *et al.* disclosed the method of claim 32, wherein the high energy radiation comprises x-ray radiation (soft x-ray, column 4, lines 20-39).

With regard to claim 34, Richardson *et al.* disclosed the method of claim 32, wherein the high energy radiation comprises extreme ultraviolet (EUV) radiation (column 4, lines 20-39).

With regard to claim 35, Richardson *et al.* disclosed a high energy lithographic system, comprising: a high energy source (300); an optical device (450) for focusing high energy radiation from the high energy source; a mask, which receives focused high energy radiation from the optical device; and a specimen (700), which is imprinted with the pattern of the mask by the high energy radiation passing therethrough.

With regard to claim 36, Richardson *et al.* disclosed the high energy lithographic system of claim 35, wherein the high energy radiation comprises x-ray radiation (soft x-ray, column 4, lines 20-39).

With regard to claim 37, Richardson *et al.* disclosed the high energy lithographic system of claim 35, wherein the high energy radiation comprises extreme ultraviolet (EUV) radiation (column 4, lines 20-39).

### ***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cash, Jr. (U. S. Patent No. 6,049,588) as applied to claim 19 above, and further in view of Early *et al.* (U. S. Patent No. 5,265,143).

With regard to claim 27, Cash, Jr. disclosed the optical device of claim 19. However, Cash, Jr. failed to teach that the plurality of plates are formed from a material having a density of less than  $6 \text{ g/cm}^3$ .

Early *et al.* disclosed an optical element that comprises a glass substrate such as ZERODUR® (density  $2.53 \text{ g/cm}^3$ ) and ULE® (density  $2.21 \text{ g/cm}^3$ ) having low surface roughness and low thermal expansion over the operating range (column 4, line 47 - column 5, line 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the substrate materials disclosed by Early *et al.*, since a person would be motivated to use a substrate that has the above mentioned qualities.

***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


- (1) Bowen *et al.* (U. S. Patent No. 6,881,965 B2) disclosed a multi-foil optic.
- (2) Foster *et al.* (U. S. Patent No. 6,624,431 B1) disclosed a high collection angle radiation collimator and focusing optic.
- (3) Igarashi *et al.* (U. S. Patent No. 6,587,538 B2) disclosed a detector unit that comprises a collimator.
- (4) Johnson (U. S. Patent No. 6,470,072 B1) disclosed an x-ray anti-scatter grid.
- (5) Guru *et al.* (U. S. Patent No. 6,175,615 B1) disclosed a plurality of collimating plates (200).
- (6) Ferlic *et al.* (U. S. Patent No. 6,055,296) disclosed a radiographic grid.
- (7) Hoffman *et al.* (U. S. Patent No. 5,799,057) disclosed a collimator and detector for CT systems.
- (8) Fraser *et al.* (U. S. Patent No. 5,727,044) disclosed microchannel plates.
- (9) Zarnoch *et al.* (U. S. Patent No. 5,581,592) disclosed an anti-scatter x-ray grid.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Allen C. Ho, Ph.D.  
Primary Examiner  
Art Unit 2882

19 June 2006